

## Chapter 3 - Maps

<u>Day</u>	<u>Activity</u>	<u>Homework</u>
1	Notes I Urban Daydreams USGS Exploring Maps*	Latitude, Longitude Practice
2	Notes II, III Pace-and-Bearing Map* NC Scavenger Hunt*	
3	Notes IV, V Building a Topographic Model	Concept Map

Activities with an \* can be found in the supplemental text.

### Alternate Activities

1. USGS Exploring Maps- Lesson plans with teacher's guide included <http://interactive2.usgs.gov/learningweb/teachers/exploremaps.htm>
2. NC Scavenger Hunt uses North Carolina road maps and sends students on a hunt for locations, landmarks, and places in our state. This activity works well for lower level classes.
3. Find local soil maps and have students analyze, compare and contrast soil types in different areas of North Carolina.
4. Find local geologic maps and have students find local resources and suggest areas of NC best suited for land development.

5. Create topographic maps with clay. This website contains instructions and maps.

[http://www.msucleus.org/membership/html/k-6/uc/geography/6/ucg6\\_3a.html](http://www.msucleus.org/membership/html/k-6/uc/geography/6/ucg6_3a.html)

NC Goals:

2.05 Create and interpret topographic, soil and geologic maps using scale and legends.

## Chapter 3 - Maps

### How do maps tell a story?

#### I. The History of Maps

- A. Maps can provide information about the past as well as people's philosophy and cultural basis.
- B. Maps are a universal medium for communication, easily understood and appreciated by most people, regardless of language or culture.  
Incorporated in a map is the understanding that it is a "snapshot" of an idea, a single picture, a selection of concepts from a constantly changing database of geographic information.
  1. The oldest maps date to Babylonian clay tablets around 4000 B.C.
    - a. Maps showed where they lived, how big their backyard was, and the taxes they paid
  2. Ptolemy- created the first world map (AD 150)
    - a. His work was a culmination of Greek and Roman cartography
    - b. His estimation of the size of the earth was smaller than actuality
    - c. Wrote a book called Guide to Geography- his instructions for maps was used by cartographers for more than 1000 years!
  3. 3<sup>rd</sup> century Rome- developed the earliest road maps
  4. Middle Ages- maps reflect life philosophy
    - a. Jerusalem was often depicted at the center of the world with East oriented at the top of the map
    - b. maps were often guidebooks to direct pilgrims to sacred places
  5. 15<sup>th</sup> Century- printing made maps more readily available

6. 16<sup>th</sup> Century- whole world maps
  - a. Columbus used Ptolemy's map on his voyage to the new world
  - b. 1541 Geradus Mercator was a lead cartographer that created a whole world map (Mercator projections still exist today)
7. 17<sup>th</sup> Century- cartographers measured land by means of triangulation to make maps more accurate
8. 18<sup>th</sup> and 19<sup>th</sup> Century- the application of the scientific method helped improve the accuracy of maps
  - a. United States Geological survey began creating maps of the US in 1879
  - b. Public Land Survey created to systematically subdivide land areas (original thirteen colonies existed before the use this system)
9. Post World War II- Aerial photographs were used to increase the accuracy of maps
10. 1970's and 1980's- major shifts in cartography
  - a. GPS (Global Positioning System)- consists of 24 satellites taking images to help cartographers map with great accuracy
  - b. GIS (Geographic Information Systems)- uses computer software, hardware, digital data, people, organizations, institutions for collecting, storing and analyzing georeferenced materials to create maps

### Review Questions

1. What has improved the accuracy of maps over time?
2. What do maps of the Middle Ages suggest about people's life philosophy?

3. What other events did Ptolemy's cartography influence?

## II. Essential Components of maps

- A. Title- like a book, tells the reader the subject to be addressed
- B. Date- when data for compilation were collected
- C. Legend- (also called a key) explains the symbols the map may contain
- D. Location Reference- where on Earth are the map data applicable
  - 1. Latitude and longitude
    - a. Meridians- (lines of longitude) vertical lines running North and South , measure of distance east and west of the Prime Meridian
      - i. Prime Meridian- runs through Greenwich England, labeled 0 degrees longitude
      - ii. International Date Line- located along the 180-degree meridian
    - b. Parallels- (lines of latitude) horizontal lines running east and west, measure of distance north and south of the equator( 0 degrees latitude)
  - 2. Public Land Survey System- uses a grid system of square miles to subdivide land
- E. Scale- provides information on the ratio between map distance and earth surface distance
  - 1. Fractional Scale- Ex. 1:800 - means one unit on the map represents 800 units on land (one inch on the map equals 800 inches on land)
  - 2. Graphic or Bar scale- "map ruler" for measuring distance, commonly seen on road maps
- F. Source- establishes a measure of map reliability (Where did you get your information?)

## Review Questions

1. What are the six essential components of a map?
2. What would a fractional scale of 1:24,000 suggest about the size of the area being mapped?

### III. Map Distortions- Unrealistic representations

- A. Field measurements are subject to errors of accuracy and precision
- B. All maps are estimations, generalizations, and interpretations of true geographic conditions
- C. All maps are a product of the human endeavor and can be biased
- D. No map can depict all physical, biological and cultural features

### IV. Map Projections- representations of a three-dimensional object on a flat surface

- A. Mercator projections- shows accurate shapes of continents but distorts area
- B. Equal Area Projection- shows accurate area but distorted shapes
- C. Robinson Projection- has accurate continent shapes and land areas with some distortion at the poles

## Review Questions

1. If all maps are distorted to some extent, how are cartographers using technology to increase their accuracy?
2. What are possible sources of error in data that would cause a map to be inaccurate?

## V. Types of Maps

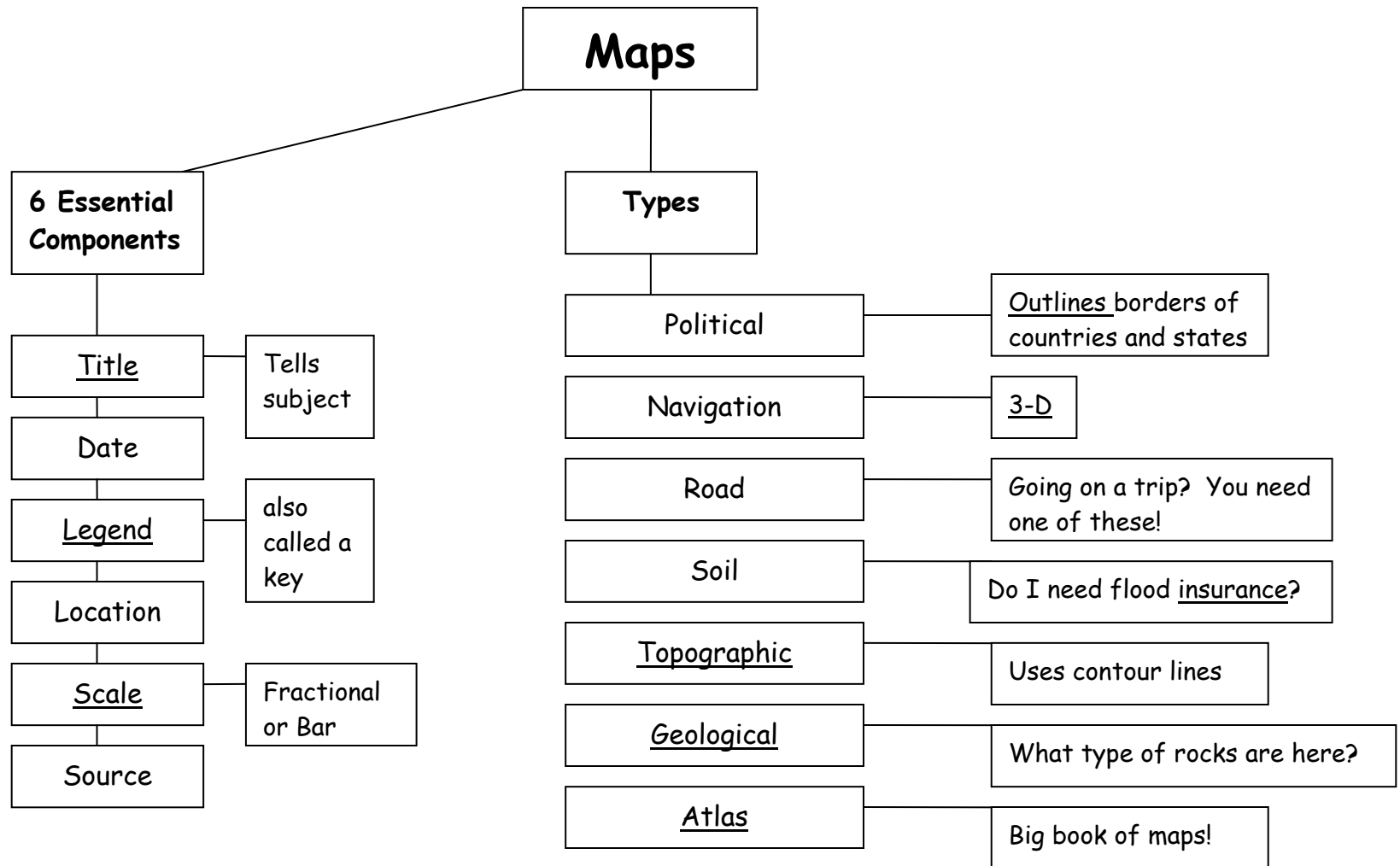
- A. Political Maps- outline the borders of countries and states
- B. Physical Relief Map- similar to a topographic map but in 3-D
- C. Road Map- a map that would have all the states and major roads
- D. Navigation Map- a map of the oceans usually gives miles in nautical miles, especially used by shipping and Navy
- E. Topographic Map- accurately represents the earth's natural and manmade features. Used as tools for planning (i.e. dams, highways, urban development).
  - 1. Shows relief (variations in elevation) by using contour lines (a line that passes through all points on a map with the same elevation)
  - 2. Use symbols to represent features
  - 3. General rules to follow when reading a topographic map
    - a. A contour line of one elevation never crosses, or intersects another elevation
    - b. Each contour line represents only one elevation
    - c. Closely spaced contour lines represent a steep slope, those placed far apart represent a gentle slope
    - d. Contour lines that cross a valley are V shaped, the V points upstream
- F. Geological Maps-shows distribution, relationship, and composition of earth materials, different colors usually tell you the different types of rocks and faults
  - 1. Used by land-use planners to identify and determine which areas are suitable for agriculture and urban development

2. Used to locate and protect sources of groundwater, mineral deposits and energy sources
    - a. Geologic maps help protect groundwater supplies from further pollution by allowing environmentalists knowledge of permeable rock types in areas where water supplies are recharged.
    - b. Scientists can predict possible mineral and energy sources based on rock types within regions.
  3. Used to identify potential geologic hazards (earthquakes, landslides etc.) by identifying rock types, and fault lines allowing scientists to predict future events and threats.
  4. Fundamental resource for environmental and engineering applications
- G. Soil Maps- show broad areas that have distinctive patterns of soil, relief ( topography), and drainage
1. Used by land, and city planners
  2. Practical uses- buying a home, building a home, decisions about flood insurance, where to build roads
- H. Atlas- a book of all kinds of maps

### Review Questions

1. What types of maps might a contractor building a home use when considering properties to develop homes upon?
2. How can geological maps be important economically for our society?
3. What professionals might find topographic maps useful to work with?





<u>Word Bank</u>		
Title	3-D	Geological
Legend	insurance	Atlas
Scale	Topographic	Outlines

# **Urban Daydreams: You Should See What I See**

**Adapted from National Geographic Xpeditions**

## **Overview:**

We respond daily to situations that call upon the use of our mental maps. Usually these situations are as minor as giving directions to our home for a friend's visit. Knowledge and experience influence the use of our mental maps. This activity will use your perceptions of cities around the world and your school to better understand what factors affect your own mental maps, and how perceptions of the world affected cartographers throughout time.

## **Materials:**

Blank Paper

Blank map of world

## **Procedures:**

### **Activity 1- Memory Map**

1. Create a memory map of your school.
2. On the blank sheet of paper draw the map of your school and include items of interest, your daily route to classes, all important locations in the school, location of your locker, where you eat lunch, etc. Include anything that stands out in your mind as you create your map of your school.
3. Upon completion, compare your maps with others.
4. Answer the activity 1 analysis questions.

### **Activity 2- "Important Cities in Your Mental Atlas"**

1. Using your world outline map list, locate, and label what you think are the ten most important cities on the map. Below each city briefly name and



### **Analysis- Activity 1**

1. How were your maps different from your classmates?
2. How do people's perceptions of places influence maps?
3. How might your map compare with a graduating senior that has been at the school for 4 years? Why would there be differences?

### **Analysis-Activity 2**

Now that you have compiled a list of ten important cities with your classmates, **choose one city** that you feel is the most important overall.

1. What perceived factors made the city you chose seem important?
2. How might people of different ages (generations) view this city based on life experiences?
3. How do people's cultural and regional influences affect their perceptions of places?
4. In the Middle Ages the city of Jerusalem was often depicted at the center of maps. How can you explain that statement based on what you have learned about maps?

